

### 2.2.6 HWC Residence Time

The HWC MACT rule defines hazardous waste residence time as *"the time elapsed from cutoff of the flow of waste into the combustor until solid, liquid and gaseous materials from the hazardous waste exit the combustion chamber."* This is a regulatory term used to define when a unit is operating under a hazardous waste combustion mode. For the purposes of establishing the residence time for WTI's rotary kiln system, this calculation is based on the time required for solid materials to pass through the kiln. This computation is a function of the diameter and length of the kiln, the angle of inclination and the kiln rotational speed. The equation for residence time is as follows:

$$RT = KL / [(Tan IA) \times (KS) \times (Pi) \times (KID)]$$

where,

**RT** = residence time, minutes

**KL** = Kiln length = 43 ft.

**IA** = Inclination angle = 3 degrees = 0.05236 radians

**KS** = Kiln rotation speed, which varies from 0.05 to 0.5 rpm

**Pi** = constant = 3.14159

**KID** = Kiln inside diameter = 14.5 ft.

At a kiln speed of 0.05 rpm, the solid phase residence time would be 360 minutes or 6 hours. At a rotational speed of 0.5 rpm, the residence time would be 36 minutes. Using an RPM curve, a computation is performed to provide the operator with a "counter" representing the amount of time left until the kiln is burned out and no longer is under the MACT Subpart EEE regulations. The counter is reset to 360 after every bulk or drum feed. When the counter counts down from 360 to 0 and there are no lances established, the waste retention flag is no longer set.

### 2.2.7 Fugitive Emissions

WTI complies with the requirements of 40 CFR 63.1206(c)(5)(i)(B) for controlling combustion system leaks of hazardous air pollutants (HAPs) by maintaining the maximum combustion zone pressure lower than ambient pressure using an instantaneous monitor.

Pressure shrouds have been installed around the kiln inlet and outlet seals to prevent combustion system leaks during pressure spikes. The shrouds are pressurized to mitigate the severity and duration of combustion system leaks during high pressure events. The shrouds maintain a positive pressure with reference to the secondary combustion chamber. The assumption is that combustion gas may leak into but not out of the combustion chamber as long as the shroud pressure is positive with respect to the combustion chamber.

Under normal operating conditions the induced draft fan maintains the pressure in the combustion chamber below ambient conditions. During pressure spikes, the shrouds act as an alternative means of controlling combustion system leaks. This is equivalent to maintaining the pressure in the combustion zone below ambient pressure. (Please refer to Appendix A of the approved CPT Plan for

a copy of the U.S. EPA letter dated Sept, 4 2003 for details on the AWFCO as it pertains to the combustion chamber pressure.)

## **2.2.8 Other MACT Operating Requirements**

### **2.2.8.1 Startup, Shutdown Malfunction Plan**

WTI has previously developed and placed in the operating record a Startup, Shutdown and Malfunction Plan (SSMP) in accordance with 63.6(e)(3) and 63.1206(c)(2)(ii)(B). The SSMP describes, in detail, procedures for operating and maintaining the source during periods of startup, shutdown, and malfunction; and a program of corrective action for malfunctioning process and monitoring equipment used to comply with the relevant standard.

### **2.2.8.2 Operation and Maintenance Plan**

WTI has previously developed and placed in the operating record an Operation and Maintenance Plan (O&M Plan) in accordance with 63.1206(c)(7). The O&M Plan describes in detail procedures for operation, inspection, maintenance, and corrective measures for all components of the combustion system that could affect emissions of regulated hazardous air pollutants. The plan prescribes how the facility operates and maintains the combustor in a manner consistent with good air pollution control practices for minimizing emissions at least to the levels achieved during the CPT. This plan ensures compliance with the operation and maintenance requirements of 63.6(e) and minimizes emissions of pollutants, automatic waste feed cutoffs, and malfunctions.

### **2.2.8.3 CMS QC Program Plan**

WTI has previously prepared and currently operates under a CMS QC Program Plan as required by 40 CFR 63.8(c)(3), 63.8(d) and the Appendix to Subpart EEE. This document provides detailed instrument specifications and audit and calibration procedures for all of the continuous monitoring instrumentation (including the continuous emission monitors) associated with the RKI system.

### **2.2.8.4 Feed Stream Analysis Plan**

WTI has previously updated and revised the RCRA waste analysis plan (WAP) such that it now incorporates all required elements of a MACT Feed Stream Analysis Plan (FSAP). The FSAP specifies the following information relative to WTI's hazardous waste streams:

- Parameters to be analyzed;
- How the data are obtained (i.e., direct sampling and analysis or from other sources);
- How the data will be used to document compliance with applicable feed rate limits;
- Test methods used;
- Sampling methods used to ensure collection of representative samples; and
- Frequency of analyses.

### **2.2.8.5 Operator Training and Certification**


WTI has previously developed and implemented an Operator Training and Certification (OTC) Program as required by 40 CFR 63.1206(c)(6). The OTC program is designed to provide training to all personnel whose activities may reasonably be expected to directly affect emissions of hazardous air pollutants from the incineration system. Control room operators are trained and certified in

accordance with 40 CFR 63.1206(c)(6)(iii). At least one certified control room operator is on duty at the site at all times while the unit is in operation.

### 2.2.9 Certification

Heritage-WTI hereby certifies that:

- (i) All required CEMS and CMS are installed, calibrated and continuously operating in compliance with the requirements of Subpart EEE;
- (ii) Based on the results of comprehensive performance testing conducted in March and April 2010, the rotary kiln incineration system is operating in compliance with the emission standards and operating requirements of 40 CFR Part 63 Subpart EEE; and
- (iii) The OPLs required by 40 CFR 63.1209 and specified in this NOC ensure compliance with the emission standards.

<b>Signature:</b>	
<b>Name:</b>	Mr. Frank Murray
<b>Title:</b>	Vice President and General Manager
<b>Date:</b>	11/18/10



## 3.0 Introduction and Process Description

### 3.1 Introduction and Project Background

The WTI facility is subject to the HWC MACT rule promulgated by the U.S. EPA on September 30, 1999 in 40 CFR 63 Subpart EEE. Initial comprehensive performance testing to document compliance with the interim standards was performed in September and December 2003 and March and April 2004.

In preparation for this test program, WTI submitted a series of plans and negotiated on a number of issues in order to result in an overall test protocol that was acceptable to all parties. The CPT was conducted in accordance with the final approved CPT Plan, Revision 7, dated August 4, 2010. Comprehensive performance testing to document compliance with the replacement standards was performed in March, April, May and September 2010.

### 3.2 Facility Overview

The WTI incinerator is a rotary kiln incineration system with primary and secondary combustion chambers that treats solid wastes as well as aqueous and organic liquids. The process is monitored and controlled by a DCS capable of continuously monitoring the process to assure all operational parameters are within regulatory and permit limits while waste is being fed to the unit. In addition, this incinerator is equipped with a CEMS that continuously samples the exhaust gases for oxygen and total hydrocarbons in the stack gas exhaust stream. In addition, a comprehensive air pollution control system is operated to comply with all emission standards.

### 3.3 Process Description

This section presents a summary description of the WTI incinerator train. Detailed process and instrumentation diagrams (P&IDs) for individual system components as well as the overall treatment train were provided in Appendix B of the approved CPT Plan. Brief descriptions for each major section of the overall combustion system are provided below. Further details can be found in the aforementioned CPT Plan.

#### 3.3.1 Overall Waste Treatment System

##### 3.3.1.1 Primary Combustion Chamber (PCC)

The PCC is capable of incinerating containerized, bulk, and pumpable waste in solid, liquid, gaseous and sludge form. The rotary kiln is 16 ft (5.0 m) in diameter, and is 43 ft (13.1 m) in length. The kiln is constructed of carbon steel with a refractory inner lining. Seals located at each end of the kiln are designed to minimize leakage of air into the kiln. Fugitive emissions from the kiln are prevented through two mechanisms. First, negative pressure is maintained in the kiln by the I.D. fan and the pressure is measured at the discharge end of the kiln. Any time a pressure greater than 0 in. w.c. (2 second delay) is measured or the primary air fan shuts down, a AWFCO is initiated by the Bailey Control System. Second, emissions from the feed end of the kiln between the kiln refractory and the front wall are controlled by keeping this area under positive pressure from air supplied by the primary air fan. As described above, the primary air fan is an AWFCO. The slight incline of the kiln is designed to provide a solids residence time of 1 to 2 hours to ensure effective waste treatment.

### **3.3.1.2 Secondary Combustion Chamber (SCC)**

The SCC provides for continued burning and retention time. Solid particles passing to the SCC and residue from the kiln drop into a water filled quench tank below the SCC. The SCC achieves complete burnout of incinerator off-gases by maintaining an elevated temperature for sufficient time and by ensuring turbulent mixing through introduction of steam, secondary combustion air and/or oxygen. The SCC is refractory lined, and has an insulated outer shell to minimize heat losses. Flue gas from the SCC flows into the heat recovery boiler. The dimensions of the SCC are 18'2" wide x 18'7" long x 56'6" high.

### **3.3.1.3 Oxygen Injection**

WTI injects pure oxygen through lances in the SCC to assist in the conversion of carbon monoxide (CO) to carbon dioxide (CO<sub>2</sub>). This process promotes the CO to CO<sub>2</sub> conversion reaction and is especially important in those situations where drummed waste of high heat content results in a temporary depletion of available oxygen caused by the sudden input of fuel and only limited oxygen available through the primary air fan. The oxygen injection system becomes operational upon detection of an oxygen deficient condition in the SCC. The control room operator can also manually activate the system if it is believed that a particular drum will cause such an oxygen deficient atmosphere. The use of the oxygen injection system has proven to be quite successful and has resulted in a significant reduction in THC spikes and associated waste feed cutoffs.

### **3.3.1.4 Waste Heat Recovery Boiler**

The waste heat recovery boiler (HRB) utilizes heat generated from waste incineration to produce steam for plant use. Flue gas temperatures entering the boiler are approximately 1380°F; flue gas leaving the boiler is approximately 700°F. Particulate accumulation on tube surfaces is removed by mechanical rapping, which occurs every 30 minutes during normal operation. Gases from the boiler section pass on to the evaporative quench section (spray dryer).

### **3.3.1.5 Evaporative Quench (Spray Dryer)**

The Spray Dryer performs two functions; (1) the cooling of the flue gas; and (2) the evaporation of effluent or blowdown from the four stage wet scrubber. The spray dryer is constructed of carbon steel and is heated and insulated to prevent corrosion. The cylindrical-shaped unit is approximately 36 feet in diameter and 104.5 feet tall. At the base of the unit is a cone-shaped hopper that collects salts and fly ash. The inlet temperature of the flue gas is approximately 700 to 750°F; the temperature at the outlet is approximately 400°F.

## **3.3.2 Waste Feed Systems**

### **3.3.2.1 Liquid Waste Feeds**

The front wall of the kiln is equipped with six (6) steam or air-atomized pumpable waste lances referred to as the organic lance, the high Btu lance, the aqueous lance, the slurry lance, the sludge lance, and the secondary sludge lance. The sources of the waste for these lances can vary depending on the operation plan for any specific day. Typically, one or two of those lances are being used for material being directly fed from a tanker, and one of those lances is being used for material being fed directly from a drum. The lances that are assigned to these streams will vary. The remaining lances are being fed from the liquid waste tank farm or the pump-out tanks.



### 3.3.2.2 Solid Waste Feeds

Solid wastes are fed into the incinerator through a common feed chute from three different sources: containerized material, the skip hoist, and the bulk solid pits. The containerized feed system can feed any container that will physically fit through the feed chamber. Currently, 55 gallon drums (paper and metal), 85 gallon over packs, boxes of various sizes, 5 gallon buckets, and various cans are fed via this system. There are no individual weight restrictions, however there is a total solid feed limit which encompasses all solid feed mechanisms and does not restrict feeds from any one mechanism. The solids feed to the kiln may be a combination of the three mechanisms or entirely from one of the feed mechanisms as long as the feed limit is maintained.

### 3.3.2.3 Process Vent Streams

The process vent system is supplied by the waste storage and waste processing areas throughout the facility. The waste storage areas include the organic tank farm, the pump-out tanks, the drum warehouse, and the bulk solids pits. The process areas include the external truck wash, the drum sampling area, the drum splitting area, the drum pump-out area, the drum extruder, the two direct tanker feed bays, and the direct drum feed system. This system consists of a centrifugal fan that draws a vacuum on the drum processing building and the bulk feed pits. The vapors that are released by drums when they are being sampled or pumped out are drawn into the fan by a duct system. If the incinerator is online, the vapors are drawn into the primary combustion air system which is the major source of air used for combustion. If the incinerator is offline, the fan then pushes the vapors through an activated carbon adsorption system.

### 3.3.2.4 Supplemental Fuels

Fuel oil and natural gas are two supplemental fuels that are used in the incineration process. There are gas burners present in the front wall of the rotary kiln which are used during heat up and cool down periods and when incineration conditions require additional fuel. The fuel oil is fed to the organic lance from a dedicated fuel tank in the Tank Farm. This material is used during heat-up and cool-down periods and to maintain temperature while waste is not being fed to the kiln. There are also gas burners present in the secondary combustion chamber but the gas lines have blind flanges installed and therefore the burners are not functional.

### 3.3.3 Air Pollution Control Equipment

The flue gas cleaning system (FGCS) consists of an oxides of nitrogen (NO<sub>x</sub>) control system and an electrostatic precipitator (ESP) followed by a quench and multistage wet scrubber. The system is also equipped with a **proprietary** activated carbon injection system for controlling PCDD/PCDF and mercury emissions. The overall FGCS also includes an induced draft fan, a plume suppression system and exhaust stack.

## 3.4 Process Monitoring

The plant DCS is a Bailey Network 90 system. Process and motor control are performed in the DCS. The operator control console is located in the control room and consists of three operator stations, each with two screens.

The natural gas burners are supervised by microprocessor based flame safety systems. Burner status and control are provided for in the DCS. The auxiliary fuel supply set point, which indicates a failure, is the natural gas supply side pressure.

### 3.4.1 Continuous Monitoring Systems

A variety of process parameters are monitored to ensure ongoing compliance with applicable MACT standards. Continuous monitors are used to track all of the operating parameters summarized previously in Table 2-3.

### 3.4.2 Continuous Emissions Monitoring System

An extensive array of instrumentation is used to monitor the stack gas stream on a continuous basis. A brief description of the CEMS instruments including the operating range and measurement principal is provided in Table 3-1.

**Table 3-1 Continuous Emission Monitoring Instrumentation**

Location	Instrument Type	Meas. Basis	Range	Mfg.	Model No.	Serial No.
<b>REHEAT DUCT</b>	Flow	Wet-scfm	0-50,000	USI	Ultraflow 100	Q-08572U-0793
<b>STACK OUTLET</b>	THC # 1	Wet	0-100 ppm 0-500 ppm	CAI	600HFID	U12054
	THC # 2	Wet	0-100 ppm 0-500 ppm	CAI	600HFID	U12055
	O <sub>2</sub>	Dry	0-25 %	Thermox	2000	C127340-102
	O <sub>2</sub>	Dry	0-25 %	Thermox	2000	C206379
	O <sub>2</sub>	Wet	0-25 %	Thermox	2000	C101180-102
	O <sub>2</sub>	Wet	0-25 %	Thermox	2000	10206503
	Flow	Wet-scfm	0-100,000	USI	Ultraflow 100	Q-08571U-0793
<b>SCRUBBER OUTLET</b>	Flow	Wet-scfm	0-80,000	USI	Ultraflow 100	9407820
	Calc. Flow	Wet-scfm	N/A	N/A	N/A	N/A
J:\Air_Tox\Project Files\Von Roll America\MACT CPT Plan 2007\WTICEMEQ.xls\MACT CEMS						Revised: May 2009



## 4.0 Process Operating Conditions

### 4.1 Overview of Planned Test Conditions

This CPT was designed to demonstrate performance for the WTI Rkl system through implementation of a comprehensive emission measurement program using a combination of actual and surrogate feed materials. The CPT was conducted under two (2) process operating test conditions to enable demonstration of all required emission levels and process monitoring requirements. The test conditions planned included a maximum pumpable waste / minimum temperature scenario (Condition 1) and a maximum solids feed / maximum total waste feed scenario (Condition 2). The details of each test condition and the materials that were planned to be fed are discussed in the following sections.

#### 4.1.1 Test Condition 1

Condition 1 was designed to establish a minimum operating temperature and maximum pumpable waste feed rate. This condition included a moderate chlorine input level and normal feed levels for other constituents. During normal operation, chlorine feeds typically range from very low levels (less than 100 lb/hr) to the facility's previous MACT limit of 2,828 lb/hr. A moderate level in this case was expected to be approximately 500-1,000 lb/hr. Emission measurements during Condition 1 included POHC DRE and PCDDs/PCDFs. Spiking of one organic constituent (monochlorobenzene) was performed during this test condition. Test Condition 1 was completed successfully on March 31 and April 1, 2010. During the first run (C1-R1), one process interruption occurred due to a THC exceedance where sampling was suspended at 13:30 and then resumed at 15:52. The process data summaries in Appendix A have therefore deleted this time period from the averaging.

#### 4.1.2 Test Condition 2

Condition 2 was designed to establish maximum total chlorine feed rate and maximum total solids throughput. This condition included a maximum chlorine input level and maximum feed levels for ash and inorganic (metals) constituents. Emission measurements during Condition 2 included PCDDs/PCDFs, metals, particulate matter and HCl / Cl<sub>2</sub>. Spiking of several surrogate metal constituents (chromium, lead and mercury) was performed during this test condition. Test Condition 2 was originally initiated in March/April but could not be completed due to waste feeding issues and high sulfur levels. Test Condition 2 was started again in May and was ultimately found to be partially successfully due to failure of mercury and PCDDs/PCDFs. All other parameters tested complied with the applicable standard. During the first run (C2-R1), one process interruption occurred due to the replacement of a metal spiking pump where sampling was suspended at 11:16 and then resumed at 11:45. The process data summaries in Appendix A have therefore deleted this time period from the averaging.

#### 4.1.3 Test Condition 2 Retest

Due to the failure to demonstrate compliance with PCDDs/PCDFs and mercury during the original Condition 2 test in May 2010, a retest was performed in September 2010. This retest was referred to as Condition 2RT and entailed emission measurements for PCDDs/PCDFs and mercury only. Mercury was the only constituent that was also spiked into the waste feed line during the retest. No process interruptions occurred during Condition 2RT.